

Managing Land for Water Resources: The Role of Economics

Margaret Walls
Resources for the Future



AMS Washington Forum
Panel on Water Resources
April 12, 2016

Ecosystem Services from Natural Lands

Forests, wetlands, and other natural lands provide a range of ecosystem services...

- flood protection
- storm surge attenuation
- protection of drinking water sources
- carbon sequestration
- wildlife habitat
- stormwater management
- urban heat island mitigation



April 2016



But Many Questions...

- How well does the “green infrastructure” approach work?
- How much does it cost?
- How does it compare with alternative (gray infrastructure) approaches?
- And many more...



What Role for Economics?

Understanding and Quantifying Costs and Benefits

- Costs = Opportunity costs
- Benefits = Value of the ecosystem services provided and other “non-market” public and quasi-public goods
 - Requires special techniques, good data, links to ecological & physical outcomes, quality control (e.g., what qualifies as a “benefit?” avoiding double-counting)
- Evaluating “at the margin”



April 2016

How Role for Economics? (cont.)

Trade-offs, alternatives, targeting

- Evaluating alternative land use scenarios and/or alternative (non-green) approaches
- Spatial targeting for cost-effectiveness
- How to deal with multiple benefits—complements vs substitutes

Policy design and evaluation

- How to get there from here
 - Payments for Ecosystem Services, Zoning, Transfer of Development Rights, User Fees, Development Impact Fees
- Did we get what we hoped? How to appropriately measure and evaluate



April 2016

Some RFF Research: Floodplains

Lower Fox River Basin in Wisconsin

- If land in the floodplain projected to be developed by 2025 is preserved instead
 - what are the flood protection benefits?
 - what are the costs under alternative targeting rules?

Paper published in Environmental Science & Technology 47(8), April 2013 (Kousky et al.).



St. Louis County, Missouri

- Retrospective benefits & costs of Meramec Greenway
- Spatial targeting of conservation lands, with climate change

Papers published in Ecological Economics, August 2014 (Kousky & Walls); Land Economics, Feb. 2015 (Walls et al.)



Some RFF Research: Coastal Areas

Chesapeake Bay Region

- What is the protective value of wetlands for attenuating hurricane storm surge?
- As wetlands are inundated by sea level rise
 - What is value lost? How do we allow for wetland migration, target conservation?

Work in progress (w/C. Ferreira, civil engineer). Several 2016 presentations, available upon request

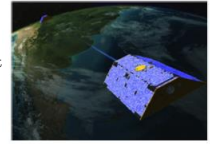
- Where will households live as risks increase with climate change?
 - Economic agent-based model of land/housing mkts
- What policy instruments might encourage relocation?

Paper under review: Modeling Coastal Land and Housing Markets: Understanding the Competing Influences of Amenities and Storm Risks (Walls et al. 2015)



Some RFF Research: Value of Information

- Can information from NASA's Gravity Recovery and Climate Experiment (GRACE) satellite mission improve drought monitoring?
 - Create enhanced groundwater storage and soil moisture measurements (GRACE-DA)
 - Use to improve U.S. Drought Monitor
 - Econometrically analyze effect of alternative drought measures—with and without GRACE-DA—on farm income



Paper under review: The Value of Remotely Sensed Information: The Case of GRACE-Enhanced Drought Severity Index (Bernknopf et al. 2015)

April 2016

Thank you!

Comments, questions, requests for papers and more information:
walls@rff.org

<https://sites.google.com/site/margaretannwalls/>

On Twitter: @margaretwalls1



April 2016